ABSTRACT OF THE DISCLOSURE

An apparatus for forming thin films forms a plurality of thin films in a single chamber by sequential formation of at least a first and a second thin film on a substrate by an antenna type plasma CVD method. This apparatus is provided with a residual material removal apparatus, which removes from the chamber residual materials resulting from the step for forming the first film and which affect the properties of the second film. A method and an apparatus for forming films and a solar cell removes residual material (including material gas) resulting in the step for forming the first film which have an effect on the properties of the second film. Since a plurality of films are deposited inside a single chamber, it is unnecessary to provide a plurality of chambers, thus enabling the apparatus and solar cell to be more compact and of reduced cost.